COMPANY PROFILE

Warm Welcome to Join Hands with Our **REDO** Chain!!!

Founded in 2020, **REDO Skill Maturing Workshop**, the name itself has its solution which was started to recycle your skills which you left as it was some days ago. You cannot get your wasted time back, but you can get another chance to redo your process of implementing your dream work from now and with us to grow logically even more than better and stronger. We **never try to educate** our candidate's mind **by commanding, grading or by triggering their mind by promising for fake placements**. Rather we create passion on the work, **we make them understand "why they came to us, what they learn from and how can they make money out of it" if they spend their valuable time with us.**

Our Secret of Success and Our Strength Is,

"We Never Work for Feedbacks..., We Work for Results…"

Important Things About Us:

- ✓ **Origin(al):** As We represent us as **"A Proud Training Unit of Embuzz Technologies Private Limited"**, We Don't Give Fake Certificates or Support Indiscipline Peoples
- ✓ **Real Coaching / Training Content:** We Don't have Time / Money / Energy Wasting Fake Syllabus
- ✓ **Ability After Coaching / Training:** We Don't Blabber About Placement Assurance, Rather Definitely Make Them Perform Logically and Make Candidates to Decide Their Career in Their Own Way
- ✓ **Our Approach:** We'll be Kind As Well As Aggressive Occasionally At Sessions, Depends On The Candidate's Learning Speed and Capability. **We Focus on Best Results Rather Than Best Feedbacks.** Our Best / Old Book Methods (Punctuality / Neatly Dressed / Notes Making / Communication / Discipline / etc…) Will Look Worst for Inexperienced Candidates but We Definitely Want Them to Follow Our Guidelines Without Any Excuses and Come Out Of Their Insecure Zone Technically As Well As Behaviourally Too To Grow Them Immensely.
- ✓ **We Are Unique and Very Content Specific In Delivering Contents, Definitely Candidates Will Feel While Sessions For Sure.**

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WORKSHOP AND IMPLANT TRAINING SYLLABUS

REDO Skill Maturing Workshop

(15 Hours to 30 Hours)

1. ATMEGA16 Microcontroller

- **Theory (10 hours):**
  - Overview of ATMEGA16 architecture, I/O ports, and memory
  - Interrupt handling, timers, ADC, PWM, and communication protocols (UART, SPI, I2C)
  - Embedded C programming for ATMEGA16
  - GPIO, ADC, and PWM functions with sensors and motors
- **Practicals (10 hours):**
  - Blink LEDs and use switches with ATMEGA16
  - Interfacing 16x2 LCD for displaying sensor data
  - Interfacing MEMS accelerometer for motion sensing
  - Controlling a DC motor using PWM for speed control
  - Project: Build a motorized robotic car using ATMEGA16

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2. STM32 Microcontroller

- **Theory (10 hours):**
    - Introduction to STM32 architecture and STM32CubeMX
    - GPIO configuration, ADC, PWM, and timers in STM32
    - Basics of STM32 HAL library for peripheral configuration
    - Introduction to communication protocols: UART, I2C, SPI
- **Practicals (10 hours):**
    - Interfacing a 16x2 LCD with STM32
    - Reading data from a temperature sensor using ADC
    - PWM motor control with STM32 for speed regulation
    - Interfacing MEMS accelerometer for tilt detection
    - Project: Smart home light control system using STM32

3. ESP32 Microcontroller

- **Theory (10 hours):**
    - Overview of ESP32 architecture, WiFi, and Bluetooth capabilities
    - Working with ADC, GPIO, and PWM on ESP32
    - Interfacing sensors (DHT11, LM35) with ESP32
    - IoT applications using ESP32 with cloud integration (ThingSpeak, Blynk)
- **Practicals (10 hours):**
    - Blink LEDs using GPIO on ESP32
    - Interfacing DHT11 sensor for temperature and humidity measurement
    - Implementing IoT-based temperature monitoring system using ThingSpeak
    - Controlling devices using a mobile app via WiFi
    - Project: Build a smart home automation system using ESP32

4. ARM7 Microcontroller

- **Theory (10 hours):**
    - Introduction to ARM7 architecture and instruction set
    - Setting up development environment and toolchain
    - GPIO, timers, ADC, PWM, and interrupt handling
    - Communication protocols (I2C, SPI, UART)
- **Practicals (10 hours):**
    - Interfacing LEDs and switches with ARM7
    - Reading sensor data (LM35) through ADC
    - Controlling motors using PWM on ARM7
    - Project: Create a temperature-controlled fan system using ARM7

5. FPGA Basys3 Board

- **Theory (10 hours):**
    - FPGA basics and VHDL/Verilog programming
    - Digital logic design and state machines
    - Basics of Vivado IDE and FPGA simulation
    - Signal processing and logic design with FPGA
- **Practicals (10 hours):**
    - Implementing basic gates and flip-flops in FPGA
    - Designing a 4-bit counter using Verilog/VHDL
    - Smart Motor control using FPGA
    - Project: Develop a 4-bit adder/subtractor using FPGA

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6. Arduino Uno

- **Theory (10 hours):**
    - Overview of Arduino platform and IDE
    - Basic programming concepts for Arduino (digital, analog, PWM, interrupts)
    - Working with sensors (DHT11, LM35) and motors (DC, servo)
    - Communication with external devices (RFID, GSM)
- **Practicals (10 hours):**
    - Blinking LEDs and reading switches with Arduino
    - Interfacing DHT11 sensor and displaying data on 16x2 LCD
    - Controlling a servo motor with Arduino using PWM
    - Project: Build a temperature and humidity monitoring system

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7. Arduino Nano

- **Theory (10 hours):**
  - Introduction to Arduino Nano, pin configuration, and usage
  - ADC and digital I/O on Arduino Nano
  - PWM and servo motor control
  - Serial communication (Bluetooth, GSM)
- **Practicals (10 hours):**
  - Interfacing LEDs, switches, and sensors with Arduino Nano
  - Controlling servo motors and DC motors with PWM
  - RFID-based access control system with Arduino Nano
  - Project: Develop an automated door system using Arduino Nano and RFID

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8. Robotics (Introductory Level)

- **Theory (10 hours):**
  - Introduction to robotics and motion planning
  - Sensors for robotics: IR sensors, ultrasonic sensors
  - DC motor and servo motor control
  - Basics of robot kinematics and control systems
- **Practicals (10 hours):**
  - Building a basic mobile robot using DC motors
  - Using ultrasonic sensors for obstacle detection and avoidance
  - Motor control using H-Bridge circuits for bidirectional motion
  - Project: Build a line-following robot using Arduino and sensors

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9. Advanced Robotics

- **Theory (10 hours):**
  - Advanced sensors in robotics (LIDAR, cameras)
  - Path planning and robot localization algorithms
  - Introduction to ROS (Robot Operating System)
  - Integration of AI with robotics for intelligent decision-making
- **Practicals (10 hours):**
  - Implementing a basic path-planning algorithm using ROS
  - Object avoidance with ultrasonic and LIDAR sensors
  - Integration of AI for robot decision-making (e.g., reinforcement learning)
  - Project: Autonomous mobile robot with object detection

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10. Security Systems

- **Theory (10 hours):**
    - Overview of security system components (CCTV, alarm systems)
    - Working with PIR, RFID, and GSM for security
    - GSM-based alert system design
    - IoT security considerations and encryption
- **Practicals (10 hours):**
    - Build an RFID-based access control system with Arduino
    - Design a GSM-based security alarm system
    - Interfacing PIR sensor for motion detection
    - Project: Develop a wireless security system using GSM and sensors

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11. Internet of Things (IoT)

- **Theory (10 hours):**
    - IoT architecture and protocols (MQTT, HTTP)
    - Cloud-based IoT platforms (ThingSpeak, Firebase)
    - IoT devices and sensors integration
    - IoT security issues and solutions
- **Practicals (10 hours):**
    - Build an IoT device for monitoring environmental parameters using ESP32
    - Upload data to ThingSpeak and visualize it in real-time
    - Control devices remotely using Blynk app
    - Project: Create an IoT-based home automation system

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12. Embedded Systems

- **Theory (10 hours):**
  - Embedded system design basics
  - Real-time operating systems (RTOS)
  - Low-level hardware programming and debugging
  - Power optimization in embedded systems
- **Practicals (10 hours):**
  - Design a simple embedded system with STM32
  - Implement real-time scheduling and interrupts in STM32
  - Create an automated system for controlling fan speed
  - Project: Develop a simple home automation system using STM32

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13. Artificial Intelligence (AI) for Embedded Systems

- **Theory (10 hours):**
  - Basics of AI and machine learning algorithms
  - TensorFlow Lite for Edge AI applications
  - Edge computing and AI in embedded systems
  - Neural networks for real-time data processing
- **Practicals (10 hours):**
  - Train a simple machine learning model on sensor data
  - Implement AI-based classification on an embedded system
  - Deploy a TensorFlow Lite model on Raspberry Pi or ESP32
  - Project: Create an AI-based object recognition system using a camera

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14. Data Science and Embedded Systems

- **Theory (10 hours):**
    - Introduction to data science and analytics
    - Collecting and processing data from sensors
    - Data visualization techniques for embedded systems
    - Cloud storage and real-time data analysis
- **Practicals (10 hours):**
    - Collect data from sensors (temperature, humidity, etc.) and store it
    - Visualize sensor data on a cloud platform (ThingSpeak)
    - Implement basic data analytics (mean, median, standard deviation)
    - Project: Develop a data logger for temperature and humidity data with cloud integration

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15. Biomedical Applications

- **Theory (10 hours):**
    - Introduction to biomedical sensors (ECG, pulse oximeter)
    - Basics of biomedical signal processing
    - Wireless biomedical data transmission
    - Ethical issues and standards for medical devices
- **Practicals (10 hours):**
    - Build a pulse oximeter using Arduino and a pulse sensor
    - Collect ECG data using appropriate sensors and display on LCD
    - Transmit biomedical signals using Bluetooth
    - Project: Build a simple heart rate monitor with Arduino

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16. Medical Electronics

- **Theory (10 hours):**
  - Overview of medical electronic devices and systems
  - Signal conditioning for medical applications
  - Biomedical data acquisition and display systems
  - Introduction to regulatory standards for medical devices
- **Practicals (10 hours):**
  - Implement a signal conditioning circuit for ECG or EEG
  - Design a biomedical data acquisition system
  - Build a basic ECG monitor using Arduino
  - Project: Develop a medical device interface for data logging

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17. IoT Security

- **Theory (10 hours):**
  - Overview of IoT security challenges and best practices
  - Cryptographic methods for IoT
  - Authentication and access control in IoT networks
  - Blockchain technology for IoT security
- **Practicals (10 hours):**
  - Implement encryption and decryption for secure data transfer
  - Build a secure IoT device with AES encryption
  - Integrate secure cloud communication (MQTT over TLS)
  - Project: Secure home automation system using encryption

18. Smart Wearables

- **Theory (10 hours):**
  - Introduction to wearable technologies
  - Sensors used in wearables (accelerometers, gyroscopes, ECG)
  - Power management techniques in wearable systems
  - Wireless communication for wearable devices
- **Practicals (10 hours):**
  - Build a wearable fitness tracker using Arduino
  - Measure movement using accelerometers and display data
  - Transmit data to a smartphone using Bluetooth
  - Project: Develop a wearable health monitoring system

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19. Robotics with AI

- **Theory (10 hours):**
    - Introduction to AI for robotics
    - Machine learning algorithms for robot control
    - Path planning, SLAM (Simultaneous Localization and Mapping)
    - Computer vision in robotics
- **Practicals (10 hours):**
    - Build an AI-powered robot using ROS
    - Implement basic object detection for robotic navigation
    - Develop a path planning algorithm using AI
    - Project: Autonomous robot navigation using AI algorithms

20. GSM-based Remote Systems

- **Theory (10 hours):**
    - GSM module architecture and usage in embedded systems
    - Interfacing GSM with microcontrollers
    - SMS-based communication systems and remote control
    - Applications of GSM in IoT
- **Practicals (10 hours):**
    - Build an SMS-based remote control system
    - Design a GSM-based alarm system
    - Remote monitoring of sensors via SMS
    - Project: GSM-based remote control system for home appliances

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21. Robotronics

- **Theory (10 hours):**
    - Overview of robotic systems, types, and applications
    - Basic components: motors, sensors, microcontrollers
    - Motion control techniques (DC, servo, and gear motors)
    - Robot kinematics and control algorithms
- **Practicals (10 hours):**
    - Assembling a basic robotic kit with DC motors and sensors
    - Controlling motor speed and direction using PWM
    - Interfacing ultrasonic sensors for obstacle avoidance
    - Project: Build a line-following robot

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